

2015 3rd International Conference on Adaptive and Intelligent Agroindustry (ICAIA)

ICAIA 2015



August 3rd - 4th, 2015

IPB International Convention Center
Bogor, Indonesia

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Department of Agroindustrial Technology
Bogor Agricultural University
Bogor, Indonesia

Welcome Message from The General Chairs of ICAIA 2015

On behalf of the organizing committee, it is our pleasure to welcome you to International Conference on Adaptive and Intelligent Agroindustry, Bogor, Indonesia. This is the 3rd conference on the topic that is held by the Department of Agroindustrial Technology, Bogor Agricultural University, Indonesia.

The conference is expected to provide excellent opportunity to meet experts, to exchange information, and to strengthen the collaboration among researchers, engineers, and scholars from academia, government, and industry. In addition, the conference committee invited five renowned keynote speakers, i.e. Prof Irawadi from Bogor Agricultural University; Prof Kenneth De Jong from George Mason University, USA; Dr Yandra Arkeman from Bogor Agricultural University; and Dr Guillermo Baigorria from University of Nebraska-Lincoln, USA.

The conference committee also invited Prof Noel Lindsay from University of Adelaide, Australia; Kiyotada Hayashi from National Agricultural Research Center-Tsukuba, Japan; Prof Margareth Gfrerer from Islamic State University of Jakarta, Indonesia; Dr Barry Elsey from University of Adelaide, Australia; Dr Gajendran Kandasamy from Melbourne University, Australia; and Imperial College London-British, Prof Allan O'Connor from University of Adelaide, Australia; Dr Wisnu Ananta Kusuma from Bogor Agricultural University, Indonesia; and Dr Frank Neumann from University of Adelaide, Australia, as invited speakers.

This conference was organized by Department of Agroindustrial Technology, Bogor Agricultural University and Asosiasi Agroindustri Indonesia, and technically sponsored by IEEE Indonesia Section. Furthermore, it was supported by Department of Computer Science, Bogor Agricultural University; Surfactant and Bionergy Research Center; PT Bogor Life Science and Technology; Indonesian Ministry of Industry; PT Pachira Distrinusa; and PT Kelola Mina Laut.

I would like to take this opportunity to express my deep appreciation to the conference's committee members for their hard work and contribution throughout this conference. I would like to thank authors, reviewers, speakers, and session chairs for their support to participate in the Conference. Lastly, I would like to welcome you to join ICAIA 2015 and wish you all an enjoyable stay in Bogor.

Sincerely,
Dr Yandra Arkeman
General Chairs, ICAIA 2015

WELCOMING ADDRESS

Prof. Dr. Ir. Nastiti Siswi Indrasti

Head of Agroindustrial Technology Department
Faculty of Agricultural Engineering and Technology
Bogor Agricultural University

on

**3rd International Conference on Adaptive and Intelligence Agroindustry (3rd
ICAIA)**

Bogor, August, 3 – 4, 2015

Assalamu'alaikum Warohmatullahi Wabarokatuh
In the name of Allah, the beneficent and the merciful,

Distinguish Guest, Ladies and Gentlemen

Let me first thank you all for accepting the invitation to participate in this 3rd International Conference on Adaptive and Intelligence Agroindustry (ICAIA). In particular I would like to thank Rector of IPB (Institut Pertanian Bogor/Bogor Agricultural University) Prof. Herry Suhardiyanto for supporting this event as part of the series academic event in celebrating the 52nd Anniversary of Bogor Agricultural University.

We are certainly proud to have been able to assemble this event in IPB, Bogor. The range of participants and audience at this conference is precisely something I would like to stress. Participants who followed the event more than 150 people, coming from various countries including the USA, Australia, Japan, Vietnam, Philippine, Germany and Indonesia. The main goal of the conference is to provide an effective forum for distinguished speakers, academicians, professional and practitioners coming from universities, research institutions, government agencies and industries to share or exchange their ideas, experience and recent progress in Adaptive and Intelligent Agroindustry.

The 2015 3rd International Conference on Adaptive and Intelligent Agro-industry (ICAIA) is the third forum for the presentation of new advances and research results on various topics in all aspects of innovative agro-industry that highlights the development and improvement for today and tomorrow's global need for food, energy, water and medicine. The aim of the conference is to stimulate interaction and cohesiveness among researchers in the vast areas of innovative agro-industry. Innovative Agro-industry has the ability to adapt intelligently to future global challenges, i.e. food, energy, water, and medical. Global challenges needs a new breed of Agroindustry which could produce innovative products to fulfill the needs through advanced processing technology, production systems and business strategy supported by cutting-edge information and communication technology.

The topic for this event is "Empowering Innovative Agroindustry for Natural Resources, Bioenergy and Food Sovereignty". The topics clustered into four main parts:

Track 1 : Innovative Agroindustrial and Business System Engineering

Track 2 : Frontier Approaches in Process and Bioprocess Engineering
Track 3 : Frontier Approaches in Industrial Environmental Engineering
Track 4 : Intelligent Information and Communication Technology for Adaptive
Agroindustry of the Future

This event also hosts four (4) workshops: (1) Strategies for Agroindustry Development (2) LCA for Agroindustry (3) Innovation and Technopreneurship for Agroindustry and (4) Agroindustry Informatics.

Distinguish Guest, Ladies and Gentlement,
Agroindustry transforms agricultural commodities into high value-added products. Agroindustry is industry that process agricultural products to increase their value added significantly by using technology and by considering environmental aspect and sustainability. However, with changing global demand and technology advancement, innovative agroindustry is needed in order to be competitive as well as sustainable. The challenge of future agroindustry is not merely efficiency and productivity anymore, but also the challenge to appropriately apply frontier technology as well as meeting future global demands.

Agroindustry needs to deal with the application of advance technologies and cope future global issues. Current global issues which arise and expected to exist in the future are food sovereignty, renewable energy, sustainable water management and pharmacy. The ability of agro-industry to respond the future global issues and the undoubtedly substantial increase in demand in future decades will be highly dependent on the increased application of existing technologies as well as the exploitation of new and innovative technologies.

The emergence of high technology could be applied in the agro-industry are: nanotechnology, biotechnology, bioinformatics, food processing, food packaging-waste, state-of-the-art computation and many others. The aforementioned high-technology along with computation technology could greatly advance agro-industry from a traditional system into a smart-intelligent and innovative technology. Therefore, in the new millennia, adaptive-intelligent and innovative agro-industry will contribute to solutions to global problems and brings agriculture into perfection.

Hope this conference will also discuss this issue in more detail as it is an important matter for all of us. We should no more think just how to produce high value product but it is also necessarily important how to keep our live in good quality by understanding following old saying... “You do not live at once. You only die once and live every day”.

I do not to take up any more of your time with these opening remarks. Let me simply thank you once again for sharing your thoughts with us. Here’s wishing every success for the conference. May Allah bless all of us.

Thank you for your kind attention,
Wassalamu’alaikum Warohmatullahi Wabarokatuh

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AGENDA

| Time | Activities |
|---|---|
| Monday, August 3rd 2015 | |
| 08.00 - 09.00 | Registration |
| 09.00 - 10.00 | Opening Ceremony <ul style="list-style-type: none"> • Welcoming Address: Prof. Nastiti Siswi Indrasti (Head of DAT, Fateta, IPB) • Welcoming Speech Head of Bogor Regency • Conference Opening: Prof. Herry Suhardiyanto (Rector of IPB) • Opening Speech and Conference Opening : Minister of Industry Indonesia * • Launching Expose International program DAT |
| 10.00 – 10.05 | <i>Photo Session</i> |
| 10.05 - 10.15 | <i>Coffee break</i> |
| 10.15 - 10.45 | Keynote Speech : |
| 10. 45 - 11.30 | 1. Prof Irawadi (Bogor Agricultural University, Indonesia) |
| 11.30 – 12.00 | 2. Prof. Kenneth De Jong (George Mason University, USA) |
| 12.00 – 12.30 | 3. Dr. Yandra Arkeman (Bogor Agricultural University, Indonesia) |
| | 4. Dr. Guillermo Baigorria (University of Nebraska, Lincoln, USA) |
| 12.30 – 13.30 | Lunch break |
| 13.30 – 13.50 | Plenary Session 1 : |
| 13.50 – 14.10 | Prof. Noel Lindsay (University of Adelaide, Australia) |
| 14.10 – 14.30 | Dr. Kiyotada Hayashi (National Agricultural Research Center, Tsukuba, Japan) |
| 14.30 – 14.50 | Prof. Margareth Gfrerer (Islamic State University of Jakarta, Indonesia) |
| 14.50 – 15.10 | Dr. Barry Elsey (University of Adelaide, Australia) |
| 15.10 – 15.45 | Ir. M. Novi Saputra (Marketing Director KML Food Group) |
| | <i>Discussion</i> |
| 15.30 – 15.45 | <i>Coffee break</i> |
| 15.45 – 18.00 | Parallel session A, B and C |
| 18.00 – 21.00 | Welcome Dinner |

| Time | Activities |
|--|--|
| Tuesday, August 4rd 2015 | |
| 08.30 – 09.00 | Registration |
| 09.00 – 09.20 | Plenary Session 2 : Dr. Gajendran Kandasamy (PhD in Physic, Melbourne University ; PhD in Innovation Imperial Collage, London) |
| 09.20 – 09.40 | Prof. Allan O'Connor (University of Adelaide, Australia) |
| 09.40 – 10.00 | Dr. Eng. Wisnu Ananta Kusuma, ST, MT (Bogor Agricultural University, Indonesia) |
| 10.00 – 10.20 | Dr. Frank Neumann (University of Adelaide, Australia) |
| 10.20 – 10.45 | <i>Discussion</i> |
| 10.45 – 13.00 | Parallel Session A, B and C |
| 13.00 – 14.00 | Lunch break |
| 14.00 – 15.30 | Parallel Workshop <ul style="list-style-type: none"> • Strategies for Agroindustry Development • LCA for Agroindustry • Innovation and Technopreneurship for Agroindustry • Agroindustrial Informatics |
| 15.30 – 15.45 | Coffee Break |
| 15.45 – 16.15 | Closing remark |

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Exploring an Innovative Approach to Address Non-Tariff Barriers Experienced by Small to Medium Enterprises in Downstream Coffee Production in Indonesia

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Agricultural products have becoming the main commodity to be exported by developing countries. As a one part of them, Indonesia produces several coffee products both upstream like green beans as well as the downstream like processed instant coffee. However, Indonesia's coffee exports on processed products have facing some Non-Tariff Barriers. This situation made Indonesia losing added value from processed coffee products trade. This study explores the adaptability of innovation system approach to support Indonesian processed coffee producer in facing NTBs.

I. INTRODUCTION

INDONESIA is a one of the biggest coffee producers in the world. Based on a Ministry of Industry of the Republic of Indonesia (MoI) in 2013, Indonesia was the 3rd largest coffee producer in the world with amounting to the production of 748 thousand tonnes of coffee production. There are totally 1.3 million hectares of coffee plantation in Indonesia, being composed of 1 million hectare Robusta variety coffee plantation and 0.3 million hectare Arabica variety coffee plantation that spreads almost in all continents.

However, export performance of coffee downstream products is still low. This is only 20% of total coffee export. Consequently, Indonesian coffee producers are losing their added value from processed product exports. For several years some of Indonesian coffee producers tried to enter world market. However, they faced several barriers other than import tariffs from importer countries. These barriers are defined as Non-Tariff Barriers (NTBs).

Recent studies show that tariff Escalation is not the main barrier to export; rather it is prevalence of non-

tariff barriers that limits the ability of developing countries to increase their agricultural processed exports [1, 2]. Furthermore, Intracen surveys on November 2013 found that exporters of agricultural goods are the most affected by NTBs (51% of surveyed companies), with 66% reported burdensome by regulations that applied by partner countries.

A lack of networking information sharing and coordination between parties on developing countries have made the NTBS problem more complex [2]. It is found that problems caused by the application of NTBs more derived from the exporting country rather than the importing country, although the requirements of NTBs are derived from the importing country. Therefore, there is a need to create a systematic approach that will guide pattern of coordination based on ability and responsibility of each party on exporting countries.

This study examined adaptability of innovation system approach to explore communication and knowledge sharing gap when seeking innovative solution to solve NTBs on exporting coffee processed product. Communication and information sharing among actors; business (based on preference of small medium enterprise), academic and government in Indonesia are examined by National Innovation System perspective. Those three actors are interviewed due to their role as an essential part on innovation process in solving NTBs problem of coffee processed product. Interview result is mapped by soft system methodology to explore gaps on relation between actors. For planning innovation system recommendation purpose, findings about current situation are mapped into a strategic plan based on triple helix emergence steps.

The rest of this paper is consisting of four sections. The next chapter briefly reviews NTBs as a barrier of export, while, Section 3 reviews innovation system approach foundation on resolving complex problem. Result of system approach to examine current situation and adaptability for further system

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development to build better knowledge sharing on solving NTBs problem are explored on Section 4. The last section presents some conclusions, further research and limitation.

II. NTBs AS A BARRIER TO EXPORT

A. *NTBs impact on agriculture's export*

NTBs are regulations or policies that can impact trade flows [3]. Every country creates NTBs based on its government policy and strategy. In creating NTBs, the reciprocal nature requires a country to consider not only interest of consumer but also producer. Domestic producer capability in conform to the NTBs regulation is important since it will be the standard of making NTBs. However, not all country can conform to that regulation due to differentiation of conditions. Several researchers found that NTBs made international trade becomes more difficult and less efficient between countries [4, 5]. Consequently, NTBs become a barrier on flow of international trade.

Several researchers found that export barriers from NTBs are more stringent in agriculture products [2, 6, 7]. This is because agriculture products usually have more regulations and standards than other goods. Developing countries that typically depend on agriculture export are suffering because of these barriers [1, 8]. An agriculture product like coffee is regulated with several rules since it is consumed directly to human body.

Healthy issue becomes a major concern for government to protect their domestic peoples. Sanitary standard, residue level of specific chemical, and quality standard are some of regulations that categorized as NTBs. Undoubtedly, NTBs are needed for safety and quality reasons that protect the consumer. It is found that quality standard certification on food product has successfully increase quality of imported food [9, 10]. However, it is become unnecessary if government or policy maker set a standard beyond necessity and increase it by the time [11]. Agriculture standards practise that ultimately aim to protect the consumer have deviated and become a trade protection instruments. High level standard that set by developed country has becomes a barrier for developing country to export their agriculture product.

Another type of NTBs in agriculture products are fairness regulations. Fairness issues on agriculture products such as coffee product emerge in early 2000's [12]. Market on the developed country became aware about the importance of equal profit sharing between producers, manufacturers and traders. This is lead to establishment of fair trade regulation. Nevertheless, fair trade regulation is very

complicated. It is hard for small company in developing country to understand and comply with the regulation. For developing country cases, researchers found that only major exporter can comply with fair trade regulation [13]. Farmers and small manufactures are suffers more because the regulation that actually intend to raise their welfare.

From discussion as above, it is clear that NTBs are a regulations or policies that creates by a country that can disrupt trade flow with other countries. NTBs that created by developed country has negative effect to the developing country export. Agriculture product is faced more stringent barrier as result of NTBs. This is happen because of nature of agriculture product that directly consumed by consumer. Health and safety regulation that practised by developed country is above necessary and has a propensity to escalate by period. Developed country policy that intended to give equality for agriculture product producer becomes an additional barrier for small producer in developing country since information, technology and institutional limitation. NTBs become barrier for export of agriculture product from developing country to developed country.

III. INNOVATION SYSTEM APPROACH IN ASYMMETRIC INFORMATION AND COORDINATION BETWEEN PARTIES

A. *Innovation on system perspective*

Innovation system is an approach to view and explore innovation process based on system perspective [14]. This approach is a developed concept of innovation process that put innovation as an arrangement of national production system, home-market economic position in international trade, interactive process based on research, and institutional approach in innovative activities [15]. System approach may explain dynamic problem that involving information network, communication between actors and creation of innovation concerning NTBs problem in developing countries.

As a system, innovation has several dimensions that important to be explored. They are: components, relationships and attributes [16]. Components define as the operating parts of the system of innovation, such as: actors, organisations, research institutes, policy maker and other institutions. Relationships as a second dimension are defined as links between components.

Attributes as the last dimension of system are characteristic that belong to components and relationships among them. This issue is connected to the functions of the system of innovation. Each sector or nation has it is own characteristic of innovation

system. For that reason, it is become significant to explore what kind applicable innovation system based components and relationship condition.

B. Approaches on innovation system

There are several system approaches that have developed related to innovation process in order to map innovation process. Several main approaches are input/output analysis, sectoral innovation system, and national innovation system [16]. Every approach is focusing on different system analysis. Utilisation of appropriate approaches is important to get the precise analysis and recommendation based on factual data on the field.

National Innovation System (NIS) approach is the widest framework that covering not only business but also scientific or research institution and government as policy maker [17]. Role that played by research institution, business and policy maker are considered as a single system on national level. This concept views that interactions between actors can determine development of innovation process. This approach may appropriate to this research since NTBs problem that faced by Indonesian coffee producer is involving not only regional or sectoral actors but also in national scale. Coffee producer in Indonesia is not concentrate in one area but they are scattered around the country. Policy that supports coffee production and manufacturing process still comes from central government as a national policy. Therefore the innovation system approach may cover the problem on national scope.

NIS views that knowledge as an important factor of innovational growth is cannot become scarce like other resources [18]. It will be continuously expand by the interaction among actors in the system. Communication and behavior pattern are important to be examined in searching for the most effective way for embedding knowledge on the system. On developing country case, researcher founds communication and sharing information infrastructure become a weak point that result slow economic development [17]. This is similar with this research background which Indonesia as a developing country has communication network problem. Problem solving on NTBs become less efficient since the related parties have weak system of information and innovation network.

As the consequence of wide scope that covered by NIS, this approach may lead the analysis into complexity analysis. Large numbers of actors that related and contribute to the innovation process are making the analysis of relationship among actors also become numerous. It is crucial to determine the right actors on NIS since every case tend to be different.

This approach also becomes less specific as a consequence of simplification process of complex system. Aggregation approach or analytical model is needed to determine the actors that include in the system.

C. Comprehensive Plan on Innovation System Adaptation

NIS has a goal to enhance economic development of a country and develop technology capability. However, adaptability result of NIS on a country is vary depend on the situation on the country [19, 20]. Based on the research, it is suggests that government need to plan and implement policies to successfully adapt NIS. The suggestion may appropriate to this research since NIS that try to adapt to solve NTBs problem in export of coffee product need to be support by a comprehensive plan.

The framework of NIS implementation can be adapted from the four stages of developing THM [21]. The first stage is internal transformation of each helix. On this stage, academia actors such as research institution, university, and other training institution are facilitated to do a knowledge sharing and technology transfer. The second stage is influence of one helix to another. Third, creation of new overlay based on trilateral networks. New organisation or institution may be establish to provide broader knowledge sharing and coordination process. Knowledge sharing organisation as a center of knowledge sharing becomes a key of successful NIS adaptation [22]. On the last stage, triple helix network has developed into a larger society. Information and knowledge sharing become freely distributed and stable [23]. Knowledge sharing become expanding by the time since spiraling effect between actors within the system.

All the stages is may be suitable for emerge innovation system on a country. However, it will need some period to implement each of stages. Therefore, there will be no sudden progress in innovation system condition along the process. On the other hand, this process is required a political and planning stability so can be worked sustainably.

IV. FINDINGS AND RESULTS

A. Effectiveness of collaboration between parties figures and tables

Theming processed based on interviews process with all participants was categorised and structured on a rich picture (Figure 1.). In general, there are some connections between SME business, government and academics. Moreover, there is pattern of collaboration between parties to solve

NTBs problem. However, pattern of communication is not two ways communication. As an example between academics and business, communication pattern only one way from academic. Furthermore, coordination and communication are less planned; they are based on yearly basis. Rich picture was accustomed to simplify and draw complex connection between parties.

SMEs that produce coffee processed product tried to export their product to international market. However, they found that there are several NTBs become barriers to entry. Information about NTBs in form of regulations or standards are partially accepted by business. Furthermore, they founds that information about regulations or standards that required by importing country are not easy to access. They obtain knowledge about NTBs based on experience and other informal sharing such as forum between businesses.

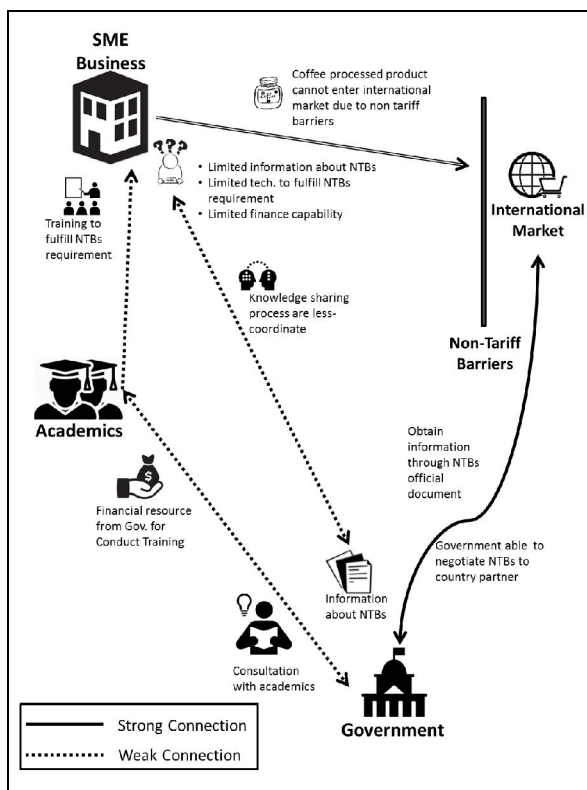


Figure 1 Communication Network Rich Picture

SMEs shares their information and knowledge with government and academics infrequently. Meeting that focusing on export of coffee product issue and involving parties is rarely conducted. Knowledge sharing between government and SMEs are unplanned and unsustain. SMEs only consult with government when they facing problems concerning exporting their product. Furthermore, there is also hesitation and distrust business to the government in solving NTBs problem. However, business is still hoping more solution from government about NTBs

problem. They thought that support from government especially on information; technology and financial access would help them very much. This situation may happen since communication process is not well performed.

SMEs business views that government is cannot completely help them in solving NTBs problem. They realise that government has many business company to support in several problems. However, they asking government to create an action plan to support export of coffee processed product. They hope that with this kind of plan there will be a sustain arrangement of information and knowledge sharing with government and academic.

Communication and information sharing between SMEs and academic are rarely happen. Information and knowledge sharing between both of them usually unscheduled. Seminars that conducted by academic, become one of event that gathering business and academic to discuss some matters. Government also occasionally creates some trainings or seminars for SME Business that recruit academic as a trainer or speaker. On this event, Academics can transfer their knowledge to solve NTBs problems. Information and knowledge sharing process between Academics, SME Business and Government is not conducted in planned and sustain matter.

In term of NTBs problem in coffee processed product, Government has some resources of information. Moreover, Government also is able to open a discussion for NTBs elimination with other countries. However, as discussed before, knowledge sharing process between Government, Academic and SME Business is not well conduct. Based on the interview, business felt that Government support in solving NTBs problem is not matched with current condition of the business. As an example, there is an event that government with some of SME businesses are going to Europe for examining coffee NTBs on several countries. SMEs view this event was cannot help them much since SME business has no capability in technology and financial to fulfill those requirements. This kind of information is not well known by government since poor communication with the business. Low effectiveness on solving NTBs problem might happen because of lack of coordination and communication between parties.

B. Barriers of knowledge and information sharing

Barriers of knowledge and information sharing between parties for solving NTBs problem on coffee processed product was explored by analysing the root cause analysis using CATWOE tool. This tool used to view information and knowledge sharing interaction that involving three parties SME business, academics

and government in a single system.

More structured form on knowledge sharing for solving NTBs problem of coffee processed product is the transformation that needed by SME. Information about NTBs that obtained by SMEs based on their daily experience is not enough to solve the problem. Information that gathered by SME concerning about NTBs is unstructured. SMEs tend to export their product as much market as they can. This sporadic effort was facing various barriers in form of NTBs requirement. Furthermore, SMEs have limited financial resource, knowledge and technology to fulfill these requirements by them self.

Academic's knowledge and technology support obviously may support SMEs to fulfill NTBs requirement. However, information and knowledge sharing between academics and SME was not well performed. It was happened since Academics and SMEs have different objectives. Helping SMEs to solve NTBs problem is not academics priority. Therefore, it is requiring kind of scheme for bridging knowledge sharing process between both parties.

Government already helps some of SMEs by accelerating their technology and knowledge ability in processing coffee product. They also had information concerning regulations and variety kind of NTBs on coffee processed product. Trainings, seminars and machinery grants are some of endeavors that government done to share knowledge and upscale SMEs abilities. Moreover, some of those activities are involving academics as a source of knowledge. However, this kind of government support for SMEs is not conducted in well planned process. Government had not created a long term plan in supporting SME of coffee processed product. There is no detail of objectives and steps to develop SMEs in coffee product that involving all parties.

This situation shown that information, knowledge and solution regarding NTBs on coffee processed product are available. However, SMEs that facing this problem did not have access to those kind of information. There are several barriers that may cause that problem. First, business, academics and government are institutions that naturally have different objective. Second, there is no long term planning to solve NTBs problem in each parties. Third, communication network between parties might weak and less structured. Those facts might become the root cause of inefficiency in solving NTBs problem on coffee processed product.

Customer, actor and owner analysis conducted based on interpretation of interview process. Customer is defined as the parties that will gained the end result of transformation process as previous sub chapter. Actors are defined as parties that will doing

the transformation process. Furthermore, owner is defined as party that will become the real owner of this transformation process.

Based on the interview it was obvious that SMEs as a SME business on coffee processed product is the party who has problem with application of NTBs by target exported countries. Sustainable plan in coordination and knowledge sharing between parties will support them on solving this problem. They are the customer that will enjoy the end result of transformation process.

Building a kind of well establish knowledge network to solve NTBs problem may requiring participation and commitment from all three parties. Business and academics need to be supported by Government on very basic part which is political will. They said that government statement in form of government law to support export activity of coffee processed product is needed by both business and academics. Moreover, academic's technological support and willingness to share in supporting the transformation process is also important for business and government. Consequently, transformation process to create a better knowledge network may demanding involvement from all of three parties as the actors.

Government may become the owner of this transformation process. Both SME and academics said that government is the party that can lead coordination process between parties. SME hoping for Government action to settled a policy and planning for coordinating knowledge sharing in solving NTBs. Meanwhile, Academics said that they confidently can fulfill some of technology requirement on NTBs fulfillment process. This is depending on the Government who can make policy and plan.

Transformation process that aim to structuring knowledge network in solving NTBs problem may be limited on several constraint. Based on the interview, SME business said that planning process might be created on national context. They thought that export supporting process may be efficient if planned in national framework. Moreover, any kind of scheme of supporting for any beverages commodity from government will be follow by KMM as a business. Consequently, transformation process might be applied in national framework.

From a broader perspective, transformation process is believed by all parties might support SME business on coffee processed product to solve NTBs problem. This part also concludes that unstructured communication process may result inefficiency on NTBs solving activities. Access of all parties to information and knowledge is unbalance between

parties. There is a need for gathering and manage information and knowledge in more structure system.

V. CONCLUSION

This paper is aim to explore adaptability of system approach on supporting coffee processed business that facing NTBs as a barrier to export their product. NTBs as an export barrier was losing added value that might receive by coffee processed business. From the preferences of SME business, NTBs become a problem because of inadequacy of information about NTBs and solution to fulfill the requirement. On the other hand, other parties such as academics and government have some information and solutions to this problem. However information network and knowledge sharing process between them are less structured and unplanned. System approach is used to view this problem from broaden perspective.

This study found that coordination and communication between parties to solve NTBs parties may be less efficient. This situation happen since there is no formal communication pattern between parties. Furthermore, there is no proper schedule of meeting between parties. This fact is similar with B. Å. Lundvall (2007) and Mohan et al. (2013), which low connectivity between parties is happen on developing countries and causing low rapidity of economic development.

Transformation process for structuring coordination and knowledge sharing process is the main process that might support enhancement of NTBs solving. However, there are some barriers that might exist on that process. Based on root cause analysis, there are three causes that might result on low coordination of NTBs solving process. First, business, academics and government are having different objective. Second, there is no long term planning to solve NTBs problem in each parties. Third, communication network between parties might weak and less structured.

Government role to transforming coordination process in knowledge sharing, still needed by business and academics. Both business and academics still view that this process should be start from government plan. Some countries like China and ex-Soviet Union was successful to create Triple Helix System that led by government (Liu & White, 2001). Therefore, Government might take a lead on coordinating the transformation by make a policy in form of government law that can be a fundamental support of coordinating process.

Based on the system approach perspective, coordination between parties is important to reach the target. Communication between components might be

stronger by intermediary institutions (Lee, Park, Yoon, & Park, 2010; Zeng, Xie, & Tam, 2010). This study found that both business and government interesting in the idea of intermediary institution to bridging the gap of communication between parties. However, academic is less interest about this idea and suggest to optimising the current institution. This is align with Massa and Testa (2008) have found. Intermediary institution might be faster the collaborative network process. However, it must also be anticipated that additional party on the system will result more complex problem if without guidance about role and function.

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